Suisun Marsh Monitoring Program
Channel Water Salinity Report

Reporting Period: March and April 2008

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1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

Station Identification	Station Name	General Location	Classification
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Classification
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

2. Monitoring Results

2.1 Channel Water Salinity Compliance

During the month of March and April, 2008, salinity conditions at all five compliance stations are in compliance with channel water salinity standards of SWRCB (Table 1). Compliance with standards for the month of March and April was determined for each compliance station by comparing the progressive daily mean of high-tide SC with respective standards. The standard for compliance stations C-2, S-64, and S-49 was 8.0 mS/cm for March and 11.0 mS/cm for April, whereas at S-42 and S-21 it was 15.6 mS/cm for March and 14.0 for April since deficiency standard applied in March and April 2008. Table 1 lists monthly mean high-tide SC at these compliance stations. The progressive daily mean (PDM) is the monthly average of both daily high-tide SC values. The mathematical equation is shown below.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\text{\# days of the month}}$$

2.2 Delta Outflow

Outflow for March 2008 started off high above 30,000 cfs as shown in Figure 5, but thereafter made a sharp decline to about 13,000 cfs by March 9 and remained in the range of 5,000 cfs to 15,000 cfs for the remainder of March and April 2008. Overall the monthly outflow patterns for both March and April are normal for this time of year. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for March and April 2008 are listed below:

Month	Mean NDOI (cubic feet per second)
March	12,989
April	9,862

2.3 Rainfall

Rainfall events for March 2008 occurred in mid-March with a monthly total of 0.46 inches, whereas April only had one occurrence which happens to be the monthly total of 0.05 inches as shown in Figure 5. For both months, the largest precipitation event occurred on March 16 with a daily total of 0.30 inches and the lowest daily total of 0.03 inches occurred on March 13. The monthly totals for both months are shown below:

Month	Total Rainfall (inches)
March	0.46
April	0.05

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during March and April 2008 are summarized below.

Date	Gate status	Flashboards status	Boat Lock status
March 1 – April 29	3 gates **held open**	In	Open-24/7
April 30	3 gates **held open**	Out	Closed

Gate operations ceased since December 17, 2007 and throughout March and April due to overall continued low channel water salinity levels in the marsh. There were small level of salinity increases but they were not enough in both months to be concern for the remainder of the control season and prompted the removal of the flashboards on April 30, 2008.

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3. Discussion

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operation of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions during the Reporting Period

During March 2008 PDM salinity levels at Collinsville(C-2), National Steel(S-64), Beldons (S-49), Sunrise (S-21), and Volanti(S-42) were mostly stable and not higher than 4.5 mS/cm as shown in Figure 1. The largest ending PDM value for March was 3.9 mS/cm at Sunrise Club (S-21) and the lowest was 0.5 mS/cm at Collinsville (C-2). In April, there were slight increases of salinity patterns throughout the month at all stations but the amount of increases were so minimal that meeting the monthly salinity standard was not a bit concern. The largest ending PDM value for April was 6.3 mS/cm at Sunrise Club (S-21) and the lowest was 1.4 at Collinsville (C-2). At monitoring stations, S-97 and S-35, salinity levels in both months followed similar salinity pattern increases like the compliance stations, but at a slightly higher magnitude given the proximity of these stations on the western side of the marsh.

Overall, salinity levels in March and April of 2008 were well below the monthly standards.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for March and April 2008 were compared with means for those months during the previous nine years (Figures 6 and 7).

Compared to previous nine years, March 2008 salinity levels and patterns were similar to that of 2007, except for S49 and S42. In 2008, S49 salinity is higher than S42, whereas in previous year these two stations salinity levels of S49 was lower than S42. This could be the effect of operating the gates less this year compared to previous year, thus allowing more salinity intrusion further up to Beldons. March 2008 month was

ranked third in high Specific Conductance, thus making it the month with the eighth lowest salinity levels.

Compared to previous nine years, April 2008 salinity levels and patterns were similar to that of 2007, except for S49 and S42. In 2008, S49 salinity is higher than S42, whereas in previous year these two stations salinity levels of S49 was lower than S42. This could be the effect of operating the gates less this year compared to previous year, thus allowing more salinity intrusion further up to Beldons. April 2008 month was ranked first in high Specific Conductance, thus making it the month with tenth lowest salinity levels.

Table 1

Monthly Mean High Tide Specific Conductance at Suisun Marsh Water Quality Compliance Stations

March 2008

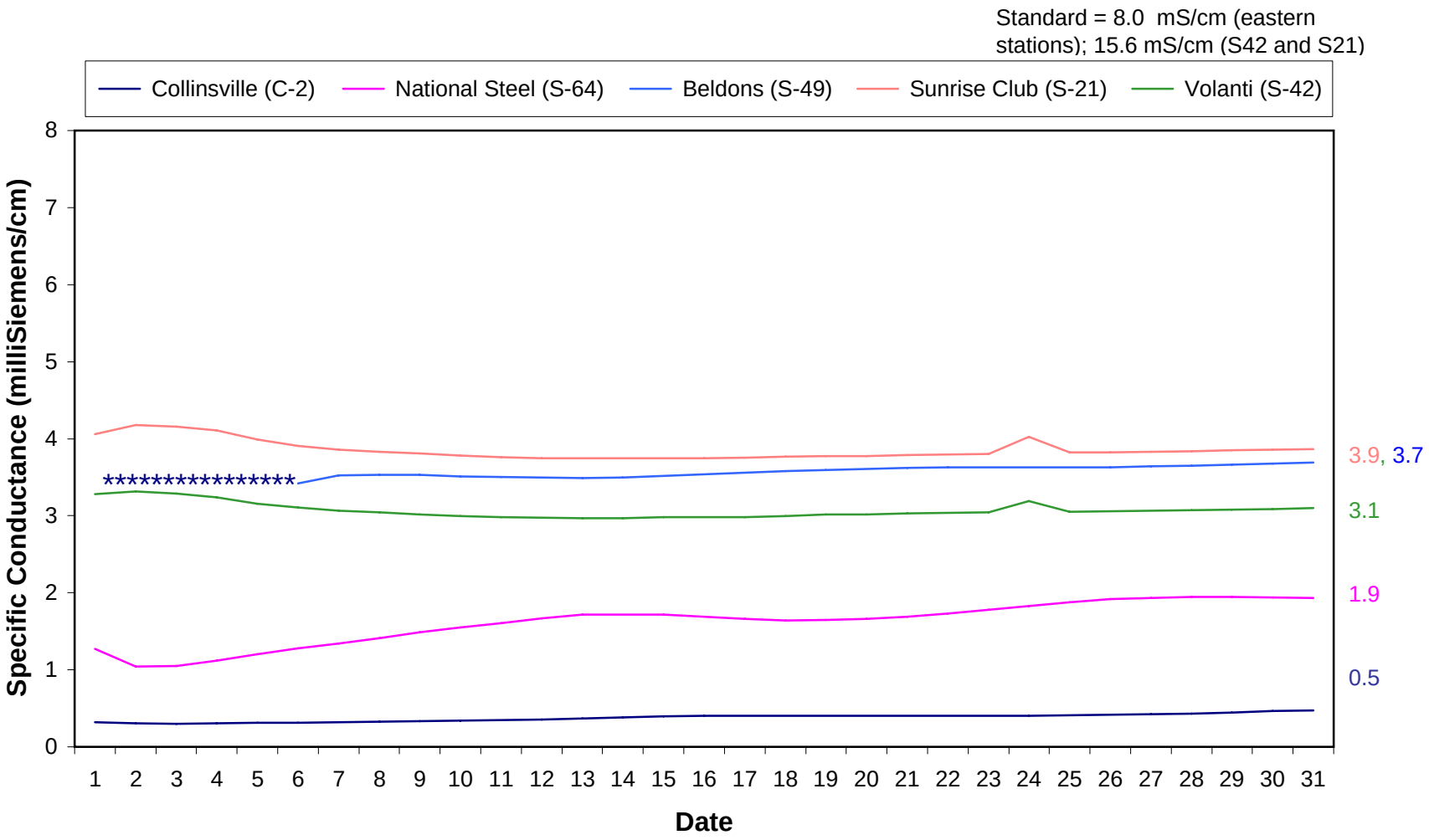
Station	Specific Conductance (mS/cm)*	Standard	Standard meet?
C-2**	0.4	8.0	Yes
S-64	1.9	8.0	Yes
S-49	3.7	8.0	Yes
S-42***	3.1	15.6****	Yes
S-21***	3.9	15.6****	Yes

April 2008

Station	Specific Conductance (mS/cm)*	Standard	Standard meet?
C-2**	1.4	11.0	Yes
S-64	2.7	11.0	Yes
S-49	5.4	11.0	Yes
S-42***	5.2	14.0****	Yes
S-21***	6.3	14.0****	Yes

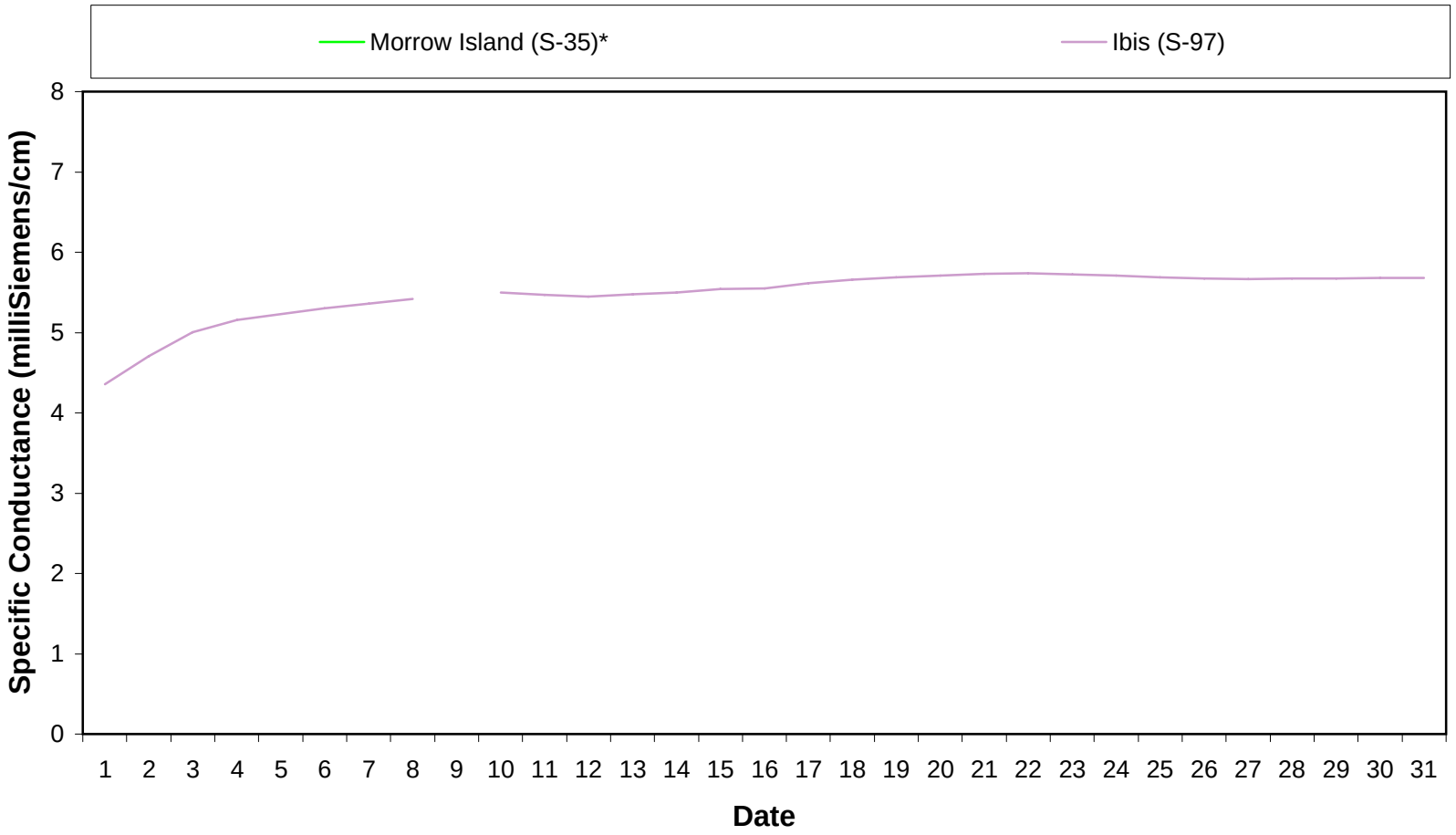
*milliSiemens per centimeter
**The representative data from nearby USBR station is used in lieu of data from station C-2.
***S21 and S42 PDM calculation based on OCO MHT values which are taken on the hour interval.
****Deficiency period was triggered in February 2008 due to 2/1/08 dry forecast and previous year 4-river index less than 11.4 MAF. Deficiency standard apply at sites S42 and S21 only as stated in D-1641.

Figure 1. Suisun Marsh Daily Mean High Tide Specific Conductance
March 2008



* * **= missing data due to equipment malfunction.

Figure 2. Suisun Marsh Daily Mean High Tide Specific Conductance
March 2008



* = S35 equipment temporarily out of service for equipment upgrade.

Figure 3. Suisun Marsh Daily Mean High Tide Specific Conductance
April 2008

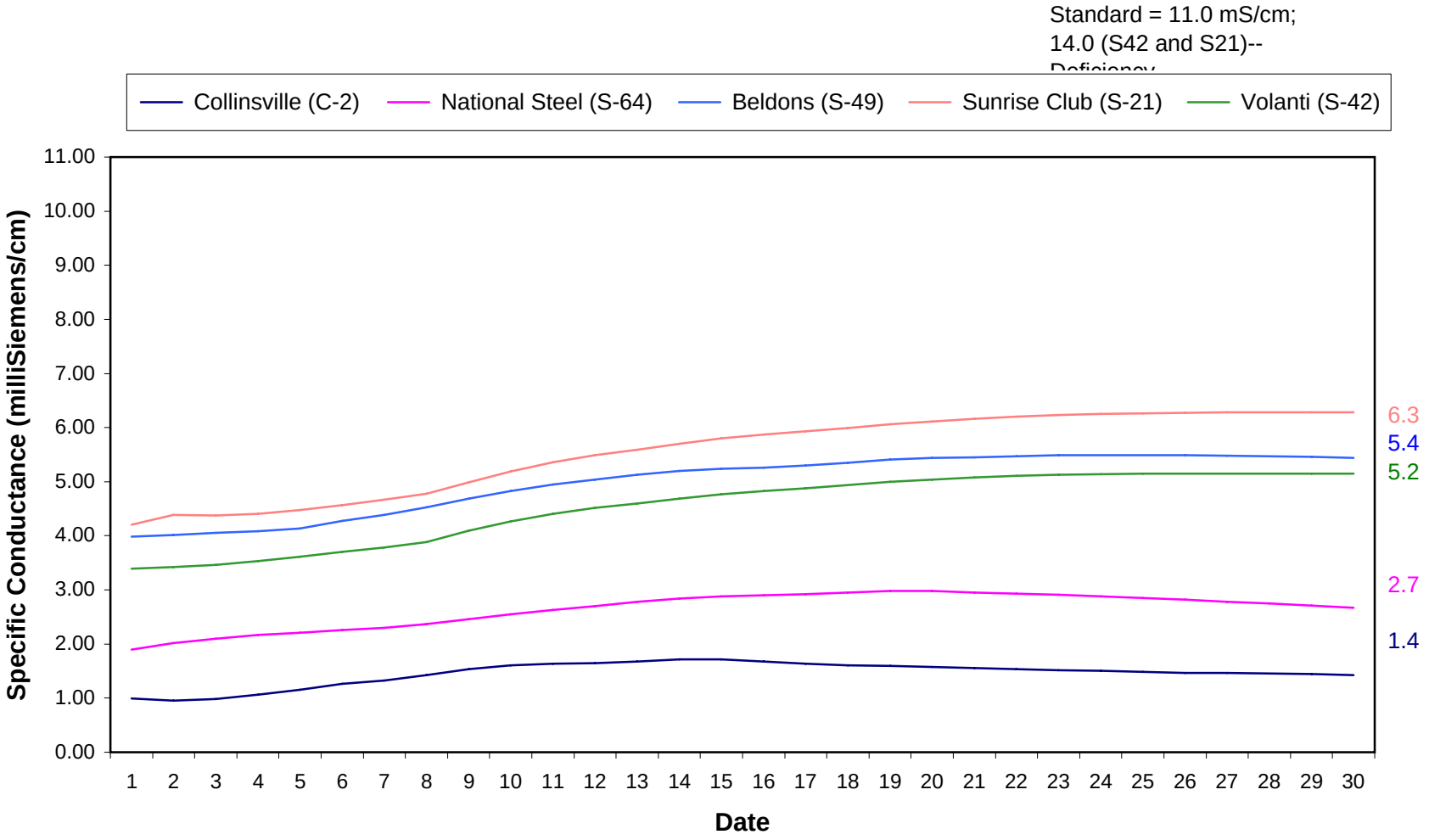


Figure 4. Suisun Marsh Daily Mean High Tide Specific Conductance
April 2008

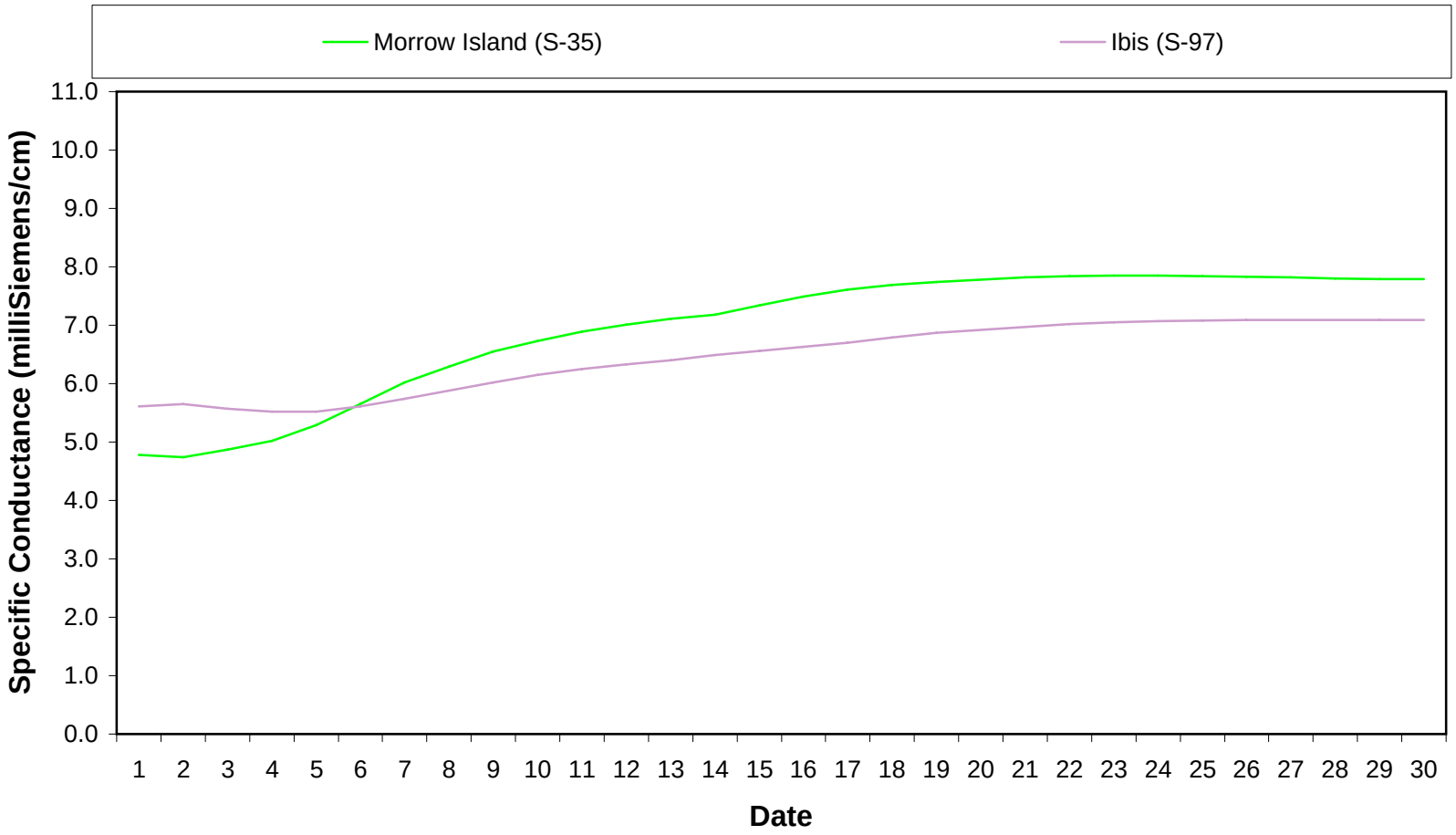
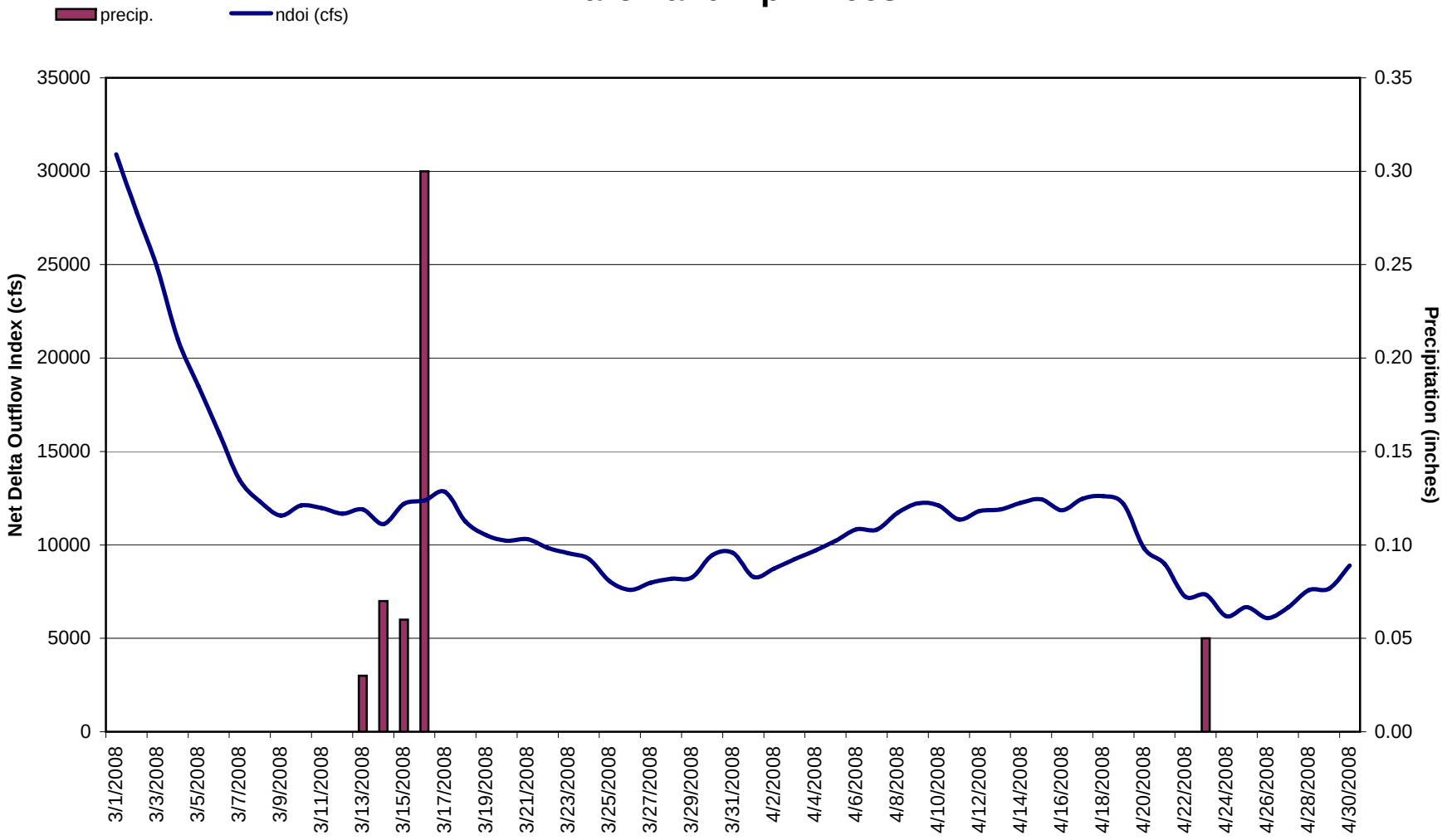
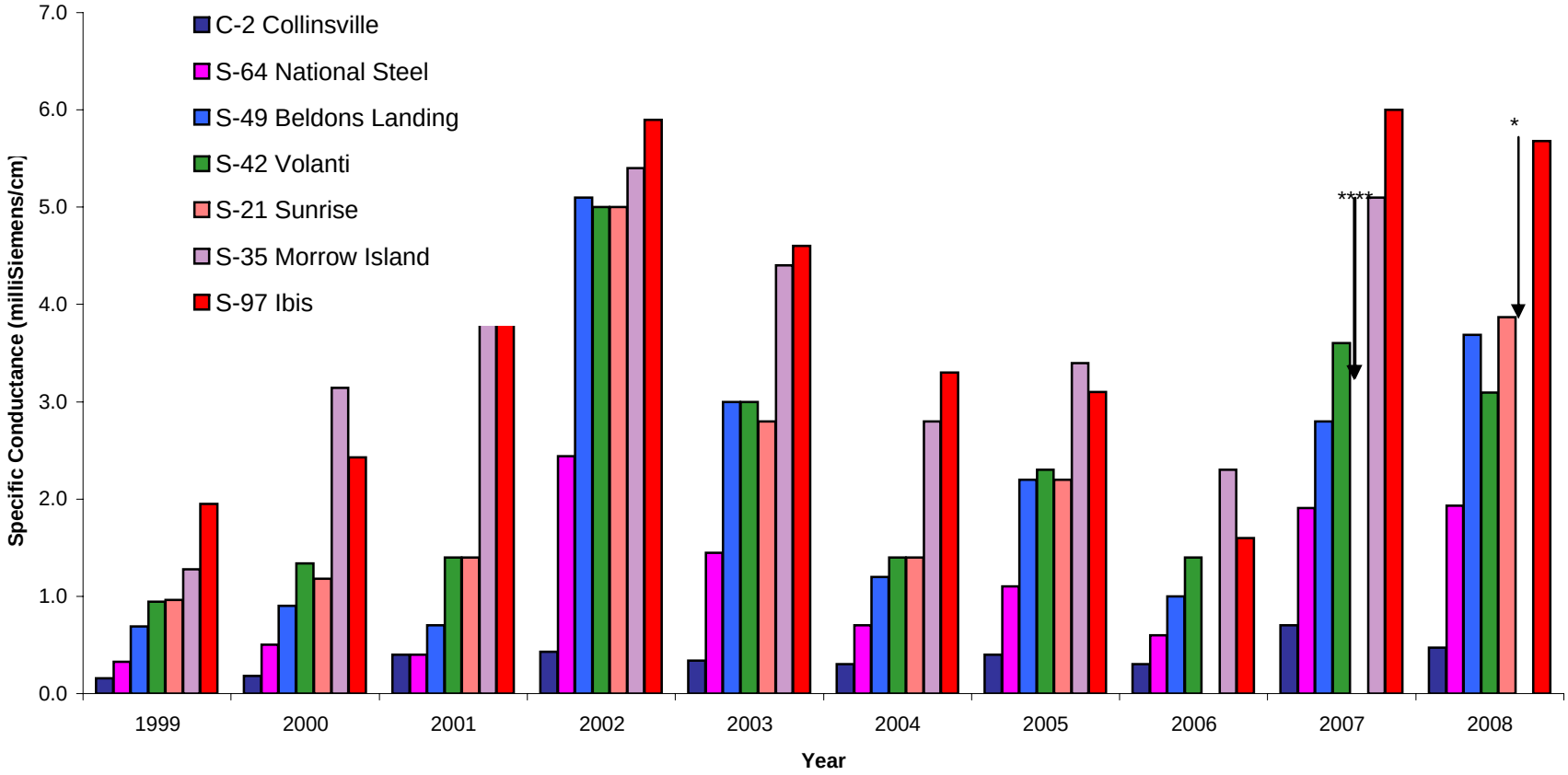


Figure 5. Daily Net Delta Outflow Index and Precipitation*
March and April 2008



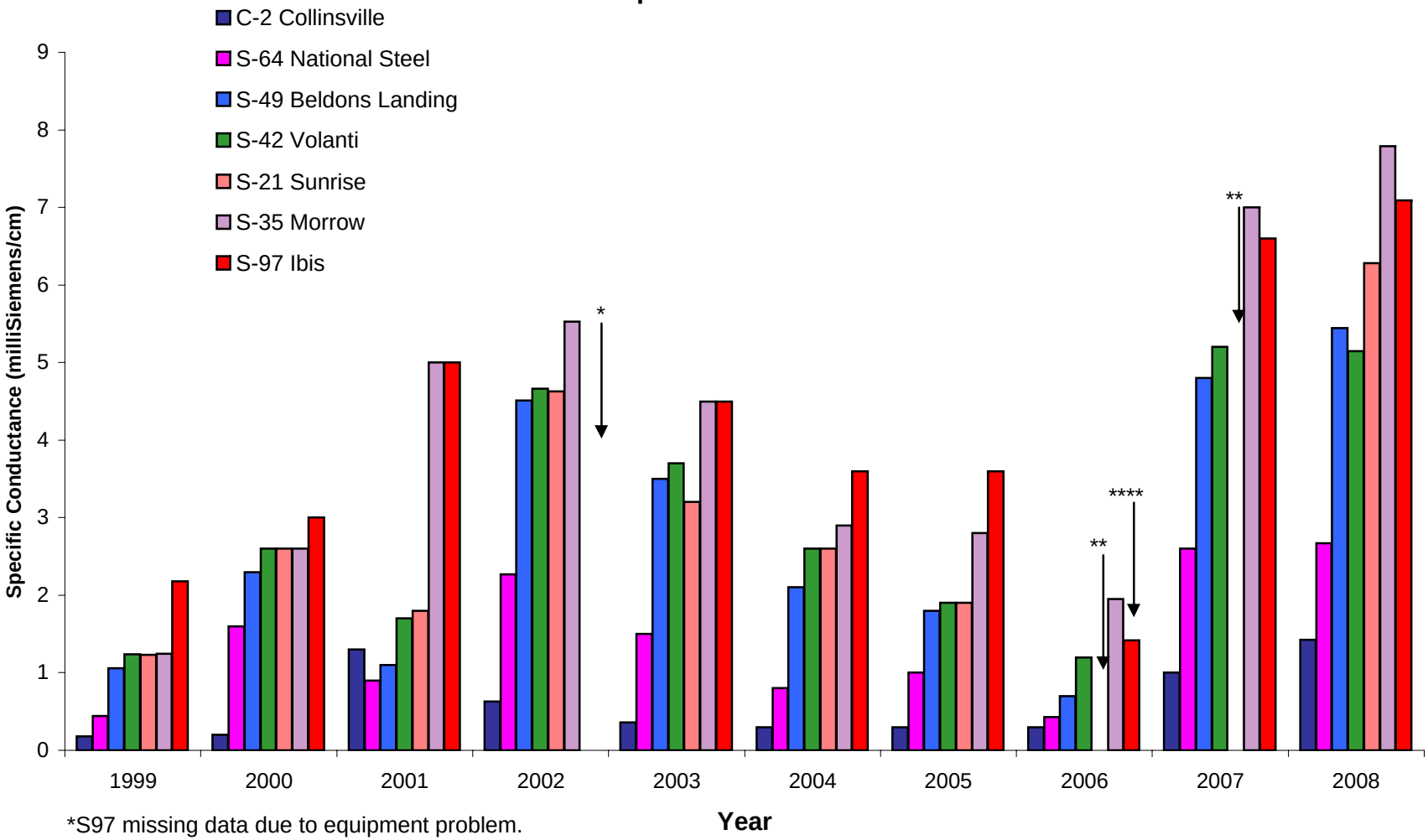
*Preliminary DWR, O&M Delta Outflow data and precipitation from Fairfield Water Treatment Plant.

Figure 6. Monthly Mean Specific Conductance at High Tide: Comparison of Monthly Values for Selected Stations March of 1999-2008

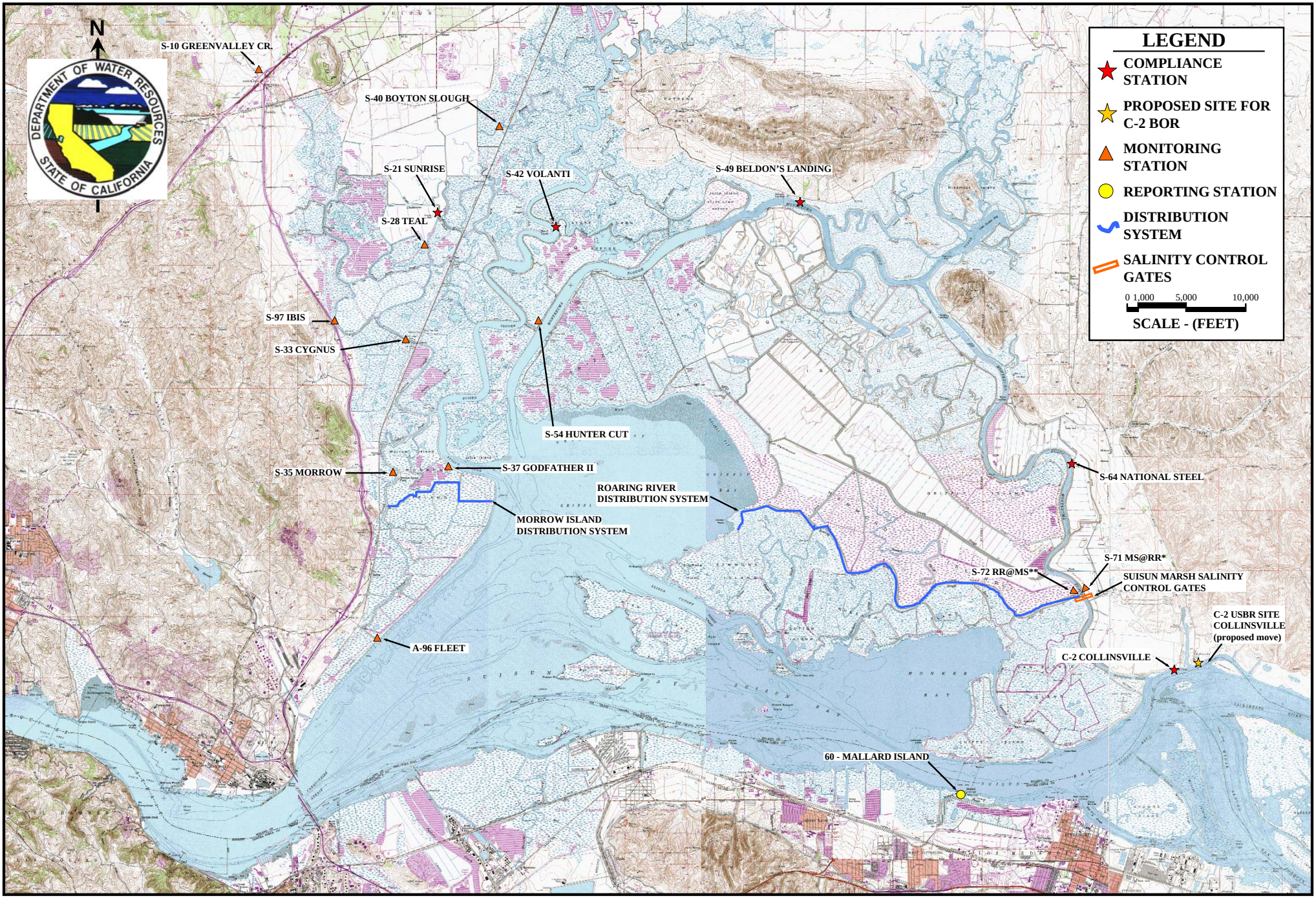


****Data not available for S21 due to flooded roadways.
*Data not available for S35 due to equipment upgrade down time.

Figure 7. Monthly Mean Specific Conductance at High Tide
Comparison of Monthly Values for Selected Stations
April of 1999-2008



*S97 missing data due to equipment problem.
**S21 data not available due to flooded roads.
****S97 data not representative of end of month value due to missing data within the month.



SUISUN MARSH PROGRAM WATER QUALITY MONITORING AND CONTROL FACILITIES